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THE ECOLOGY OF THE MANGROVES OF SOUTH FLORIDA:  
A COMMUNITY PROFILE

by

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## CHAPTER 4. COMMUNITY COMPONENTS - MICROORGANISMS

The mycoflora (fungi) are the best studied component of the microbial community of mangrove swamps. Much pioneering work has been carried out in south Florida. Reviews of the current knowledge of mangrove-associated fungi can be found in Kohlmeyer and Kohlmeyer (1979) and Fell et al. (1980).

One of the earliest studies of mangrove mycoflora was published by Kohlmeyer (1969). He discovered large populations of marine fungi on the submerged parts of aerial roots, stems, and branches and on living and dead mangrove leaves. Extensive work at the University of Miami by Fell and his coworkers (e.g., Fell and Master 1973; Fell et al. 1975, 1980) explored the role of fungi in the decomposition of mangrove leaves and the immobilization of nitrogen. Newell (1974) studied the succession of mycoflora on seedlings of red mangrove. A survey of the aquatic yeasts occurring in the south Florida mangrove zone was published by Ahearn et al. (1968).

One of the most interesting pieces of information to emerge from this extensive mycoflora research concerns the succession of organisms associated with decaying leaves (summarized by Fell et al. 1975, 1980). Senescent leaves of red mangroves are typically colonized by species of Nigrospora, Phyllostica, and Pestalotica. Once the leaf has fallen from the tree and during the early stages of decay, the fungal flora is dominated by species of Phytophthora and, to a lesser extent,

Drechslera and Gloeosporium. In the latter stages of decay the dominant genera are Calso, Gliocidium, and Lulworthia.

Understanding the occurrence and succession of fungi on decaying mangrove leaves is important because of their role in energy flow in mangrove swamps. Heald (1969), Odum (1970) and Odum and Heald (1975b) hypothesized that fungi and bacteria are important in converting mangrove leaf organic material into a form that can be digested and assimilated by detritivores (see section 3.6).

Our understanding of the role and occurrence of bacteria in mangrove swamps is not as well documented as for fungi. Casagrande and Given (1975) have suggested that bacteria are important in the early stages of mangrove leaf decomposition and are replaced in the latter stages by fungi which are better equipped to attack refractive organic compounds. Unlike the mycoflora, the bacteria are clearly important in the anaerobic regions of mangrove swamps. Vankatesan and Ramamurthy (unpubl. data) found denitrifying bacteria to be abundant and ubiquitous in mangrove soils. Zuberer and Silver (1978) have emphasized the importance of nitrogen-fixing bacteria in the zone around mangrove roots. They, in fact, were able to isolate and count a variety of types of bacteria from mangrove sediments including aerobic heterotrophs, anaerobic heterotrophs, nitrogen-fixing heterotrophs, and sulfate-reducing bacteria.